WHAT IS CLAIMED IS:

1. An optical recording/reproducing apparatus, which records/reproduces information on/from a recording medium having recording layers the number of which is represented by N ($N \geq 2$) by converging light rays from a light source thereon, comprising:

two lens groups, each including at least one lens, placed in a light path from the light source to the recording medium; and

a spherical-aberration correcting mechanism which changes a lens group gap between the two groups by means of electrical driving so as to correct spherical aberration of a converged light spot formed on one of the recording layers,

wherein, supposing that the N number of recording layers are a first recording layer, ..., an N-th recording layer in succession from the lens group side, at the time of correcting the spherical aberration of the converged light spot formed on the first recording layer, the lens group gap is represented by DIS(1) and the intensity of an applied current to the spherical-aberration correcting mechanism is ec1, and at the time of correcting the spherical aberration of the converted light spot formed on the N-th recording layer, the lens group gap is represented by DIS(N) and the intensity of an applied current to the spherical-aberration

correcting mechanism is represented by ecN,

said spherical-aberration correcting mechanism is operated so as to satisfy a relationship:

$$|ec1| = |ecN|,$$

and when the applied current intensity to the spherical-aberration correcting mechanism is zero, a lens group gap dst(3) satisfies the following relationship:

$$dst(3) = [DIS(1) + DIS(N)] / 2.$$

2. The optical recording/reproducing apparatus as defined in claim 1, wherein the two lens groups constitute an objective lens for converging light rays from the light source onto the recording medium.

3. The optical recording/reproducing apparatus as defined in claim 2, wherein, the two lens groups constituting the objective lens are designed so that, when the lens group gap is d4, a light spot derived from light rays transmitted through a light-transmitting body having an optical thickness of t4 has a minimum spherical aberration, and wherein, when the optical thickness capable of correcting the spherical aberration at the time of the lens group gap of the dst (3) is t3, t3 and t4 are virtually coincident with each other, and two recording layers of the recording medium, located at positions having optical

thicknesses from the surface on the lens group side are t3 + Δt and t3 - Δt, are allowed to have virtually the same recording density.

4. The optical recording/reproducing apparatus as defined in claim 1, further comprising:

an objective lens for converging light rays from the light source onto the recording medium, the two groups of lenses are placed between the light source and the objective lens.

5. The optical recording/reproducing apparatus as defined in claim 4, wherein:

the objective lens is set so that a light spot, derived from light rays transmitted through a light-transmitting body having an optical thickness of p4 and converged, has a minimum spherical aberration,

the two lens groups are set so that, when virtually parallel light rays are made incident thereon and the lens group gap is said dst(3), the spherical aberration of released light rays is minimized,

when the optical thickness capable of correcting the spherical aberration at the time of the lens group gap of the dst (3) is p3, p3 and p4 are virtually coincident with each other, and

two recording layers of the recording medium, located at positions having optical thicknesses from the surface on the lens group side are p3 + Δp and p3 - Δp, are allowed to have virtually the same recording density.

6. The optical recording/reproducing apparatus as defined in claim 4, wherein the two lens groups are constituted by a plano-concave lens and a plane-convex lens.

7. The optical recording/reproducing apparatus as defined in claim 1, wherein a voice coil motor is provided as the spherical-aberration correcting mechanism.

8. An optical recording/reproducing apparatus, which records/reproduces information on/from a recording medium having at least one recording layer, comprising:

a light source; two lens groups, each including at least one lens, placed in a light path from the light source to the recording medium; and

a spherical-aberration correcting mechanism which changes a lens group gap between the two groups by means of electrical driving so as to correct spherical aberration of a converged light spot formed on one of the recording layers,

wherein, in the case when the recording medium has

recording layers the number of which is represented by N ($N \geq 2$), supposing that the N number of recording layers are a first recording layer, ..., an N-th recording layer in succession from the lens group side, at the time of correcting the spherical aberration of the converged light spot formed on the first recording layer, the lens group gap is represented by DIS(1) and the intensity of an applied current to the spherical-aberration correcting mechanism is ec1, and at the time of correcting the spherical aberration of the converted light spot formed on the N-th recording layer, the lens group gap is represented by DIS(N) and the intensity of an applied current to the spherical-aberration correcting mechanism is represented by ecN,

said spherical-aberration correcting mechanism is operated so as to satisfy a relationship:

$$|ec1| = |ecN|,$$

and when the applied current to the spherical-aberration correcting mechanism is zero, a lens group gap dst(3) satisfies the following relationship:

$$dst(3) = [DIS(1) + DIS(N)] / 2,$$

in the case when the recording medium has only a single layer, an optical thickness from the surface of the recording layer on the lens group side to the recording layer of the recording medium and an optical thickness that is allowed to correct the spherical aberration when the lens

group gap is set to said dst(3) are made virtually coincident with each other.

9. A method for recording/reproducing information by using a recording/reproducing apparatus comprising:

a light source;

two lens groups, each including at least one lens, placed in a light path from the light source to the recording medium; and

a spherical-aberration correcting mechanism which changes a lens group gap between the two groups by means of electrical driving so as to correct spherical aberration of a converged light spot formed on one of the recording layers,

wherein, said recording medium is arranged so that, in the case when the recording medium has layers the number of which is represented by N ($N \geq 2$), supposing that the N number of recording layers are a first recording layer, ..., an N-th recording layer in succession from the lens group side, at the time of correcting the spherical aberration of the converged light spot formed on the first recording layer, the lens group gap is represented by DIS(1) and the intensity of an applied current to the spherical-aberration correcting mechanism is represented by ec1, and at the time of correcting the spherical aberration of the converted

light spot formed on the N-th recording layer, the lens group gap is represented by DIS(N) and the intensity of an applied current to the spherical-aberration correcting mechanism is represented by ecN, said spherical-aberration correcting mechanism is operated so as to satisfy a relationship:

$$|ec1| = |ecN|,$$

and when a lens group gap dst(3) satisfies the following relationship: dst(3) = [DIS(1) + DIS(N)] / 2, the applied current to the spherical-aberration correcting mechanism is set to zero,

in the case when the recording medium has only a single layer, information is recorded or reproduced by using the recording medium wherein an optical thickness from the surface of the recording layer on the lens group side to the recording layer of the recording medium and an optical thickness that is allowed to correct the spherical aberration when the lens group gap is set to said dst(3) are made virtually coincident with each other.